PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : G06G 7/48 — A1

(11) International Publication Number: WO 99/38102

(43) International Publication Date: 29 July 1999 (29.07.99)

(21) International Application Number: PCT/US99/01287

(22) International Filing Date: 22 January 1999 (22.01.99)

(30) Priority Data:
09/012,817 23 January 1998 (23.01.98) US

(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application
US 09/012,817 (CON)
Filed on 23 January 1998 (23.01.98)

(71)(72) Applicant and Inventor: NARAYANASWAMY, Bala [IN/US]; 2878 River Meadow, Canton, MI 48108 (US).

(74) Agents: TAYLOR, W., R., Duke et al.; Harness, Dickey & Pierce, P.L.C., P.O. Box 828, Bloomfield Hills, MI 48303 (US).

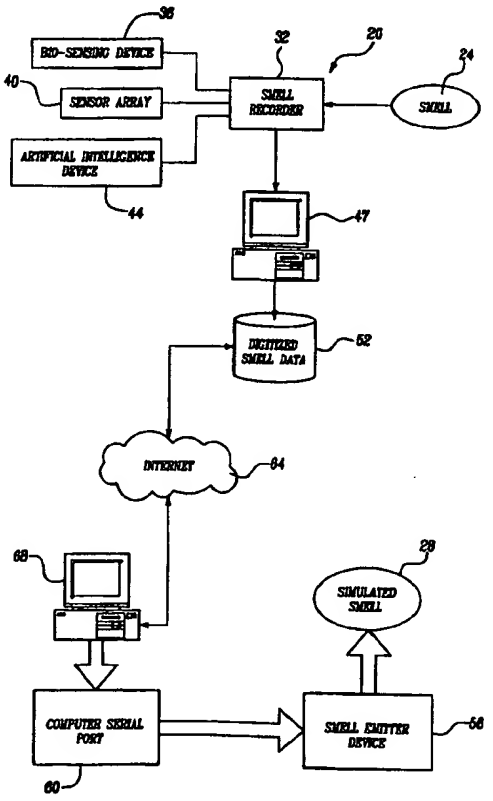
(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: OLFACTORY EMITTING SYSTEM

(57) Abstract

An olfactory advertising apparatus and method with applications to electronic media. The apparatus and method include a smell data structure that is utilized for containing smell data indicative of a smell that is to be emitted. A first computer (68) that is connected to a network (64) receives the smell data structure over the network. A smell emitter device (56) that is connected to the first computer (68) and to a gas container (314) controls the emission of the gas from the container based upon the received smell data. With such functionality, the apparatus and method can simulate and transport across a network any smell. The smell emitter device can also be used in conjunction with a number of electronic media systems, such as television, radios, cable television systems or ATMs to generate a particular smell with either sound or voice activations for advertisement purposes.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

OLFACTORY EMITTING SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to computerized smell generating systems, and more particularly to computerized smell emitting systems within a networked environment or other electronic medium distribution systems or stand-alone electronic devices.

SUMMARY OF THE INVENTION

The wide-ranging reach of the Internet has spurred a large amount of advertising on the Internet. Some companies have Internet web sites that are sufficiently sophisticated to include digitized sound recordings for advertising their products. Internet users can download and play back these audio advertisements to learn more about an advertised product.

While the Internet allows advertisements via the human sense of hearing, the human sense of smell has largely been ignored on the Internet. This human sense has been ignored despite many companies having products with particular aromas or smells that may entice an Internet user to buy the products.

For example, many pizza companies provide the service of ordering pizzas for home delivery via their respective Internet web sites. However, the web sites do not entice potential customers by allowing the customers to smell the pizza they are advertising.

Accordingly, it is an object of the present invention to provide the art with a computerized system that emits smells based upon data files received over a network, such as the Internet. With such functionality, the present invention can simulate any smell ranging from fresh cut flowers or perfumes to hot, deep dish pizza. Accordingly, floral companies, perfume companies and food companies or any smell-related company can advertise through the present invention by providing a particular smell or aroma associated with their respective products.

In accordance with one aspect of the present invention, a smell data structure is utilized for containing smell data indicative of a smell that is to be

emitted. A first computer that is connected to a network receives the smell data structure over the network. A smell emitter device that is connected to the first computer and to a gas container controls the emission of the gas from the container based upon the received smell data.

In accordance with a second aspect of the invention, a method for emitting a smell within a computerized network environment includes generating smell data indicative of the smell to be emitted. The smell data structure is transmitted across the network and is received at a first computer. The emission of a predetermined gas from a container is controlled based upon the received smell data.

Additional objects and advantages of the present invention will be apparent from the detailed description of the preferred embodiment, the appended claims in the accompanying drawings, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute part of the specification, illustrate an embodiment of the present invention and together, with the description, serve to explain the principles of the invention. In the drawings, the same reference numeral indicates the same parts.

Figure 1 is a block diagram showing the data flow among components of the present invention.

Figure 2 is a front view of the hardware configuration utilized in the preferred embodiment of the present invention.

Figure 3 is a flow chart depicting the operational steps for recording a smell using a bio-sensing recorder.

Figure 4 is a flow chart depicting the operational steps utilized by a sensor array to record a smell.

Figure 5 is a neural network schematic diagram depicting an exemplary neural network implementation for identifying smells in accordance with the present invention.

Figure 6 is a data structure depicting the hierarchial arrangement of the smell data structure.

Figure 7 is a flow chart depicting the operational steps for emitting a smell using a cylinder in accordance with the teachings of the present invention.

Figure 8 is a flow chart depicting the operational steps for emitting a smell using several cylinders for emitting a smell in accordance with the teachings of the present invention.

Figure 9 is a schematic diagram depicting the preferred embodiment of the smell emitter device.

Figure 10 is a block diagram showing the data flow among components of an embodiment of the present invention which utilizes speech recognition technology.

Figure 11 is a flow chart depicting the operational steps for emitting a smell using speech recognition technology.

Figures 12-13 depict an embodiment of the present invention operating within an ATM environment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning to the Figures, particularly Figure 1, a smell recorder and emitter is illustrated and generally designated with the reference numeral 20. In one exemplary application of the present invention, smell recorder and emitter 20 records a smell 24 in a digital format so that smell 24 can be stored, transported across the Internet 64 and reproduced at a remote location as simulated smell 28.

Within the present invention, smell recorder 32 receives smell 24. Smell recorder 32 is designed to be sensitive to the smell characteristics of smell 24. Smell recorder 32 may record smell 24 via a bio-sensing device 36 (whose operations are described in Figure 3), or may include a sensor array 40 (whose operations are depicted in Figure 4). Smell recorder 32 in the preferred embodiment utilizes an artificial intelligence device 44, such as a neural network, in order to identify smell 24 and to convert smell 24 into the proper digitized smell data.

Smell recorder 32 converts the sensed characteristics of smell 24 into digitized smell data 52 to be stored as a file on computer 47. The present invention includ s utilizing different levels of computer cards (for example, 8-bit or

16-bit cards) in order to capture and digitize smell 24. A smell card is preferably utilized for such purposes as adjusting the sample rates of the smell in order to improve the quality of the captured and digitized smell.

A feature of the present invention is that with smell 24 digitized as smell data 52, smell data 52 can be communicated over such networks as the Internet 64 to a remote computer 68. Remote computer 68 is equipped with the components of the present invention necessary to produce simulated smell 28. With this feature, digitized smell data 52 can be transported across Internet 64 to many users in order to advertise various products.

When digitized smell data 52 is needed to emit simulated smell 28, a smell emitter device 56 is utilized to convert the digitized information into electrical control signals to produce simulated smell 28. Smell emitter device 56 is within the preferred embodiment connected to remote computer 68 through a computer serial port 60. However, it is to be understood that the present invention is not limited to the interface being a computer serial port, but also includes utilizing such other computer interface mechanisms as parallel ports and infrared computer interfaces.

Within the preferred embodiment, smell emitter device 56 contains aromatic gas that has been dissolved in a solvent and stored under pressure in gas cylinders. The cylinders can be activated based upon the recorded smell to produce a composite gas (i.e., simulated smell 28) similar to smell 24.

Figure 2 shows an exemplary hardware configuration for components of the present invention. A computer 80 contains a smell recorder jack 84 and a smell recorder (not shown). A smell is recorded via smell recorder jack 84 and is processed in accordance with the teachings of the present invention in order to generate digitized smell data through ports 60 and cable 88 to smell emitter device 56. Based upon the digitized smell data, smell emitter device 56 emits a simulated smell through holes 92 that are located preferably on the front portion of smell emitter device 56.

Within the preferred embodiment of the present invention, smell emitter device 56 is sized so that it can be placed proximally to computer screen 96. Proximity of smell emitter device 56 to computer screen 96 enables a user who is

viewing information on computer screen 96 to more easily smell the simulated smell emanating from smell emitter device 56.

Figure 3 depicts the operational steps for recording the smell using a bio-sensing device. Start indication block 100 indicates that process block 104 is to be executed wherein a smell is emitted proximate to a bio-sensing recorder. At process block 108, the smell is received at a layered olfactory acceptor protein portion of the bio-sensing device. In particular, the bio-sensing device is produced by surface treating or layering olfactory acceptors protein of either human or vertebrate onto a piezo electric crystal.

The combination of the olfactory acceptor protein in combination with the molecules of the smell to be recorded effects a change in the oscillation frequency of the piezo electric crystal as depicted at process block 112. The change in the frequency is converted into an electric signal at process block 116. The digitized values are stored at process block 120 before processing terminates at termination block 124.

Figure 4 is a flow chart depicting the operational steps for recording a smell using a sensor array. Start indication block 140 indicates that process block 144 is to be executed wherein a smell is emitted proximal to a sensor array. The sensor array in the preferred embodiment includes a compound, such as tin oxide, in order to sensitize the locations of the sensor array to one or more predetermined characteristics of the smell.

When the smell passes over the sensor array, the locations at the various locations of the sensor array are excited at various levels in accordance with their composition. The smell in this way is mapped by the sensor array at process block 148.

At process block 152, a neural network is utilized that has been trained to identify the unique mappings emanating from each smell when the molecules of a specific smell are passed over the sensor array. The identified smell by the neural network is digitized and stored in a computer file at process block 156 before terminating at termination block 160.

Figure 5 shows an exemplary neural network that can be used to identify the smells from the smell recorder. Input layer nodes 184 receive data from the smell

recorder at inputs 180. Hidden layer nodes 188 are activated or deactivated based upon weights 186 as determined through prior training as well as by a predetermined function, such as a sigmoid function.

Output layer nodes 192 process the results of hidden layer 188 in accordance with their own trained weights 190 and their own predetermined function. The output of output layer nodes 192 is the identified smell which is then converted into the data necessary to complete the data structure of Figure 6. The identified smell is then converted into data necessary to activate the cylinders of the smell emitter device as indicated by Figure 6.

Figure 6 depicts an exemplary smell data structure hierarchy 220. Smell data structure 220 includes sufficient information for the smell emitter to generate a simulated smell. A preferred embodiment of smell data structure 220 includes the activation time 224 for how long a cylinder that contains an aromatic gas should be activated in order to produce a simulated smell.

When two or more gas cylinders are used within the smell emitter, additional information is included in smell data structure 220. Such additional information includes cylinder identifier data 228 and activation sequence order dat 232. Cylinder identifier data 228 informs the smell emitter of which cylinder in the smell emitter should be activated. In the preferred embodiment, the gas cylinders can be activated simultaneously for their respective activation times, or can be activated in a sequence order as provided in the activation sequence order data 232.

If the smell emitter includes a mixing device (e.g., a fan) for mixing the emitted gases from several gas cylinders, then mixing data 236 is provided to indicate when the mixing device is to be turned on and off. Mixing data 236 provides the present invention with a greater range of smells that can be combined in different ways.

Figure 7 is a flow chart depicting the operational steps for producing a simulated smell when the smell emitter uses one gas cylinder to simulate a smell. Start indication block 250 indicates that process block 254 is to be executed wherein smell data is received. Electrical control signals are produced by the smell emitter to open the solenoid valve of the cylinder as sp cified in the received smell

data at process block 258. At process block 262, the solenoid valve is closed after a predetermined time as specified in the received smell data. Processing ends at termination block 266.

Figure 8 depicts the operational steps for emitting a simulated smell when two or more gas cylinders can be simultaneously or consecutively activated. Start indication block 280 indicates that process block 284 is to be executed wherein smell data is received by a smell emitter.

At process block 288, for each cylinder specified in the received smell data, the following process is performed: the solenoid valve of each specified cylinder is open for the duration provided in the received smell data (i.e., process block 292). Concurrently with the operation of process block 288, process block 296 activates the fan in accordance with the mixing data contained in the received smell data. It should be understood that the present invention also includes not using a fan, but instead using a spray nozzle to produce the same effect.

Process block 298 deactivates the fan after the duration specified in the received smell data has elapsed. Processing ends at termination block 300.

Figure 9 depicts smell emitter device 56 that provides a smell in the form of an aromatic gas through holes generally depicted at 92. In one embodiment of the present invention, the aromatic gas is dissolved in a solvent and stored under pressure in gas cylinder 314a.

Gas cylinder 314a contains under high pressure an active ingredient which on release from cylinder 314a generates the desired smell dissolved in the solvent. Solenoid valve 318a controls the release of the aromatic gas from cylinder 314a to outside the smell emitter device 56. Solenoid valve 318a operates upon activation signals from controller 322. The activation of solenoid valve 318a is preferably a mechanical activation, but also includes electronic or the pneumatic activation as well.

Controller 322 receives the electrical control signals from computer 326. Computer 326 generates the electrical control signals based upon smell data that computer 326 has obtained via Internet 68.

In one embodiment of the present invention, smell emitter device 56 generates only one type of aroma from one cylinder. However, the present

invention also includes utilizing a number of cylinders that contain different types of gases. For example, cylinders 314a, 314b, 314c, 314d and 314e are stacked alongside each other either vertically (as shown in Figure 9) or horizontally. Depending on the type of smell that needs to be released from smell emitter device 56, the solenoid of the cylinder that contains the smell to be released is activated.

In the preferred embodiment, smell emitter device 56 includes the capability of activating the solenoid valves of the cylinders either concurrently or sequentially in order to produce a desired composite smell. The combination of the gases stored in certain predetermined amounts in the cylinders is used to generate a particular composite smell. Moreover, the present invention includes storing not just gases under pressure, but also aromatic solvents under pressure. A fan 329 is preferably provided to ensure better mixing of the gases and to circulate the emitted smell to the user.

From the different gas cylinders with various compounds, certain predetermined amounts can be released. The released predetermined amounts generate the desired aroma.

Figure 10 depicts an embodiment of the present invention which recognizes predetermined key sounds, terms, or phrases from such devices as a radio or television (or any electronic sound-emitting device) in order to emit appropriate smells. A voice or sound recognition system 364 utilizes speech or sound recognition algorithms to determine if a key sound, term, or phrase has been emitted by radio 360. For example, the simulated smell 28 of pizza is produced when system 364 determines that the key term "Pizza" has been emitted by radio 360.

For speech recognition capability, system 364 preferably employs speech recognition technology as provided in the speech recognition software products by the Dragon Systems company. Such technology preferably utilizes Hidden Markov Modeling (HMM) as described, for example, on pages 90-102 in the following text book: *Robustness in Automatic Speech Recognition*, by Jean-Claude Junqua and Jean-Paul Haton (Kluwer Academic Publishers, Norwell, Massachusetts, 1996). For sound recognition capability, system 364 preferably checks whether a certain pattern of frequencies has occurred.

However, it must be understood that the present invention is not limited to only these speech and sound recognition techniques, but includes such other techniques as the use of neural networks to recognize speech and sounds.

System 364 includes a smell data generator 369 which preferably utilizes database 370 to store a list of key sounds, terms or phrases. Smell recorder 32 is used to store smell data which is then associated in database 370 with predetermined key speech terms, phrases, or sounds.

Using the smell data generator 369, system 364 searches database 370 to determine whether any of the detected words or sounds correspond to any of the key sounds, terms or phrases in database 370. If one or more correspondences do exist, then system 364 retrieves from database 370 the digitized smell data that corresponds to the detected key sound, term or phrase. System 364 sends the retrieved digitized smell data 374 to smell emitter device 56 in order to emit simulated smell 28.

Figure 11 depicts the operational steps when the present invention utilizes speech or sound recognition technology. Start block 390 indicates that process block 394 is to be executed wherein voice or sound is emitted by a radio (or a television). At process block 398, a voice recognition algorithm (or sound recognition algorithm) is performed, such as a Hidden Markov Modeling algorithm.

Process block 402 scans database 370 (not depicted here) based upon the recognized terms or sounds. Decision block 406 determines whether the recognized sounds, terms, or phrases correspond to any key sounds, terms, or phrases in database 370. If there are no matches, then processing continues at block 394. However, if a match is found, then processing continues at process block 410.

Process block 410 retrieves from database 370 the digitized smell data that corresponds to the detected key sound, term or phrase. The retrieved digitized smell data is sent to a smell emitter device wherein process block 414 is executed.

At process block 414, for each cylinder specified in the received smell data, the following process is performed: the solenoid valve of each specified cylinder is open for the duration provided in the received smell data (i.e., process block 416). Concurrently with the operation of process block 414, process block 420 activates

the fan in accordance with the mixing data contained in the received smell data. Process block 424 deactivates the fan after the duration specified in the received smell data has elapsed. Processing ends at termination block 428.

Figure 12 depicts an embodiment of the present invention operating within an ATM machine 452 which would, for example, be provided in proximity to a banking institution. This embodiment includes utilizing a button 456 that indicates that if it is depressed that a desired smell would be released. Computer 326 in this embodiment would release the correct smell based upon detecting that button 456 has been depressed.

Figure 13 depicts a scenario flow for operating the present invention within an ATM environment. A first ATM screen 473 provides a user with the question of whether the user would like to see an advertisement and waive the ATM transactional fee. If the user selects button 475, then at process block 477 the user is charged the ATM transactional fee after the transaction has completed. Processing ends at termination block 479.

If the user selects button 456, then an advertisement (such as an advertisement for a pizza company) is displayed on a second ATM screen 481. The advertisement could include both audio and video that describes the product. While the advertisement is being displayed on the second ATM screen 481, a smell is generated at process block 483 in accordance with the teachings of the present invention. After the advertisement has been displayed for a predetermined time, then the user proceeds with the ATM transaction at process block 485. Processing ends at termination block 479.

While the above-detailed description describes the preferred embodiment of the present invention, the invention is susceptible to modification, variation and alteration without deviating from the scope and fair meaning of the subjoined claims. For example, the present invention can be utilized with videotapes that are to be played on videocassette recorders (VCRs). In that implementation, simulated smells would be emitted according to the smell data that is stored on the videotape. Mor over, the present invention also includes being utilized within cable boxes.

Also, companies can program a television or radio remote controller to operate either the television or radio in conjunction with the present invention. For example, the present invention can include a user defined control, such as a manual mode, on the remote controller which allows a user to smell an aroma independent of whether an advertisement is present. If the remote is set to automatic or to another mode, then the smells can be emitted based upon whether an advertisement is present.

In general, the present invention improves the effectiveness of advertising via computers (e.g., Internet, Web TV, etc.), televisions, radio, cable TV, ATM machines and other stand-alone electronic devices.

It is Claimed:

1. A networked multi-media computer system for emitting a smell, comprising:

a smell data structure for containing smell data indicative of the smell;

a first computer connected to a network for receiving said smell data structure over said network;

a gas container for storing a gas; and

a smell emitter device connected to said first computer and to said gas container for controlling the emission of said gas from said container based upon said received smell data.

2. The networked multi-media computer system of Claim 1 wherein said smell emitter device converts said received smell data into electrical control signals in order to control the emission of said gas from said container.

3. The networked multi-media computer system of Claim 1 further comprising:

a plurality of gas containers connected to said smell emitter device for storing predetermined gases, said smell emitter device controlling the emission of said gases from said containers based upon said smell data.

4. The networked multi-media computer system of Claim 3 wherein said gases are stored under pressure in said containers.

5. The networked multi-media computer system of Claim 3 wherein at least one of said gas containers contains a solvent under pressure.

6. The networked multi-media computer system of Claim 3 further comprising:

a mixing device for mixing said emitted gases to produce a composite smell.

7. The networked multi-media computer system of Claim 6 wherein said smell data structure includes data from the group consisting of container identification, activation duration for emitting said gas from said container, container activation sequence order, mixing data, and combinations thereof.

8. The networked multi-media computer system of Claim 3 wherein said smell data structure includes data from the group consisting of container identification, activation duration for emitting said gas from said container, container activation sequence order, and combinations thereof.

9. The networked multi-media computer system of Claim 1 wherein said smell data structure includes activation duration for emitting said gas from said container.

10. The networked multi-media computer system of Claim 1 further comprising:

a smell data recorder for producing said smell data.

11. The networked multi-media computer system of Claim 10 further comprising:

a smell input device for receiving the smell; and

a bio-sensing smell convertor connected to said smell input device for converting the received smell into said smell data.

12. The networked multi-media computer system of Claim 11 wherein said bio-sensing smell convertor includes an olfactory acceptor protein device being accessible to said received smells, said olfactory device being connected to a piezo electric crystal, said smell data being generated based upon the oscillation frequency of said piezo electric crystal.

13. The networked multi-media computer system of Claim 10 further comprising

a smell input device for receiving the smell; and

a sensor array connected to said smell input device for sensing a predetermined characteristic of the received smell.

14. The networked multi-media computer system of Claim 13 further comprising:

a neural network connected to said sensor array for identifying the smell based upon said sensed characteristic of the smell.

15. The networked multi-media computer system of Claim 1 further comprising:

a second computer for transmitting said smell data structure to said first computer via said network.

16. The networked multi-media computer system of Claim 15 wherein said network includes a global communication network communicating via common protocols, said apparatus being utilized for advertising purposes.

17. A method for emitting a smell within a computerized network environment, comprising:

generating smell data indicative of the smell to be emitted;

transmitting said smell data structure across said network;

receiving said smell data structure at a first computer;

controlling the emission of a predetermined gas from a container based upon said received smell data.

18. The method of Claim 17 further comprising the steps of:

converting said received smell data into electrical control signals; and

controlling the emission of said gas from said container in accordance with said electrical control signals.

19. The method of Claim 17 further comprising the steps of:

converting said received smell data into electrical control signals; and

controlling the emission of gases from a plurality of container in accordance with said electrical control signals.

20. The method of Claim 19 further comprising the step of:

mixing said emitted gases to produce a substantially homogenous smell.

21. The method of Claim 20 wherein said smell data structure includes data from the group consisting of container identification, activation duration for emitting said gas from said container, container activation sequence order, mixing data, and combinations thereof.

22. The method of Claim 19 wherein said smell data structure includes data from the group consisting of container identification, activation duration for emitting said gas from said container, container activation sequence order, and combinations thereof.

23. The method of Claim 17 wherein said smell data structure includes activation duration for emitting said gas from said container.

24. The method of Claim 17 further comprising the step of:

converting the received smell into said smell data using a bio-sensing smell convertor.

25. The method of Claim 24 wherein said bio-sensing smell convertor includes an olfactory acceptor protein device being connected to a piezo electric crystal, said method further comprising the step of:

generating said smell data based upon the oscillation frequency of said piezo electric crystal.

26. The method of Claim 17 further comprising the step of:

sensing a predetermined characteristic of the received smell using a sensor array.

27. The method of Claim 26 further comprising the step of:

identifying the smell using a neural network based upon said sensed characteristic of the smell.

28. The method of Claim 17 further comprising the step of:

providing a second computer for transmitting said smell data structure to said first computer via said network.

29. The method of Claim 28 wherein said network includes a global communication network communicating via common protocols.

30. A multi-media apparatus for emitting a smell, comprising:

an electronic signal receiving device for receiving signals;

a smell data generator for generating digitized smell data indicative of the smell based upon said received signals;

a gas container for storing a gas; and

a smell emitter device connected to said smell data generator and to said gas container for controlling the emission of said gas from said container based upon said received smell data.

31. The multi-media apparatus of Claim 30 wherein said smell emitter device converts said received smell data into electrical control signals in order to control the emission of said gas from said container.

32. The multi-media apparatus of Claim 30 further comprising:

a plurality of gas containers connected to said smell emitter device for storing predetermined gases, said smell emitter device controlling the emission of said gases from said containers based upon said smell data.

33. The multi-media apparatus of Claim 32 wherein said gases are stored under pressure in said containers.

34. The multi-media apparatus of Claim 32 wherein at least one of said gas containers contains a solvent under pressure.

35. The multi-media apparatus of Claim 32 further comprising:

a smell data structure for containing smell data indicative of the smell, said smell data being sent to said smell emitter device via said smell data structure.

36. The multi-media apparatus of Claim 35 further comprising:

a mixing device for mixing said emitted gases to produce a composite smell.

37. The multi-media apparatus of Claim 36 wherein said smell data structure includes data from the group consisting of container identification, activation duration for emitting said gas from said container, container activation sequence order, mixing data, and combinations thereof.

38. The multi-media apparatus of Claim 35 wherein said smell data structure includes data from the group consisting of container identification, activation duration for emitting said gas from said container, container activation sequence order, and combinations thereof.

39. The multi-media apparatus of Claim 35 wherein said smell data structure includes activation duration for emitting said gas from said container.

40. The multi-media apparatus of Claim 30 further comprising:

a smell data recorder for producing smell data to be stored in a database, said database being utilized by said smell data generator to produce said digitized smell data.

41. The multi-media apparatus of Claim 40 further comprising:

a smell input device for receiving the smell; and

a bio-sensing smell convertor connected to said smell input device for converting the received smell into said smell data.

42. The multi-media apparatus of Claim 41 wherein said bio-sensing smell convertor includes an olfactory acceptor protein device being accessible to said received smells, said olfactory device being connected to a piezo electric crystal, said smell data being generated based upon the oscillation frequency of said piezo electric crystal.

43. The multi-media apparatus of Claim 40 further comprising:

a smell input device for receiving the smell; and

a sensor array connected to said smell input device for sensing a predetermined characteristic of the received smell.

44. The multi-media apparatus of Claim 40 further comprising:

a neural network connected to said sensor array for identifying the smell based upon said sensed characteristic of the smell.

45. The multi-media apparatus of Claim 30 wherein said electronic signal receiving device is a device being selected from the group consisting of radios or televisions, said electronic signal receiving device emitting speech, said multi-media apparatus further comprising:

a speech recognition system connected to said smell data generator for recognizing predetermined speech terms emitted from said electronic signal receiving device, said smell data generator generating digitized smell data based upon said recognized predetermined speech terms.

46. The multi-media apparatus of Claim 45 further comprising:

a database for storing associations between predetermined speech terms and smell data, said smell data generator producing said digitized smell data based upon said stored associations.

47. The multi-media apparatus of Claim 45 further comprising:

a smell data recorder for producing smell data to be stored in a database, said database being utilized by said smell data generator to produce said digitized smell data.

48. The multi-media apparatus of Claim 30 wherein said electronic signal receiving device is a device being selected from the group consisting of radios or televisions, said electronic signal receiving device emitting sounds, said multi-media apparatus further comprising:

a sound recognition system connected to said smell data generator for recognizing predetermined sounds emitted from said electronic signal receiving device, said smell data generator generating digitized smell data based upon said recognized predetermined sounds.

49. The multi-media apparatus of Claim 48 further comprising:

a database for storing associations between predetermined sounds and smell data, said smell data generator producing said digitized smell data based upon said stor d associations.

50. The multi-media apparatus of Claim 48 further comprising:

a smell data recorder for producing smell data to be stored in a database, said database being utilized by said smell data generator to produce said digitized smell data.

51. The multi-media apparatus of Claim 30 wherein said apparatus operates within an ATM environment.

52. The multi-media apparatus of Claim 30 wherein said apparatus is utilized for advertising purposes via a device being selected from the group consisting of radios, televisions, cable television systems, ATM machines, and combinations thereof.

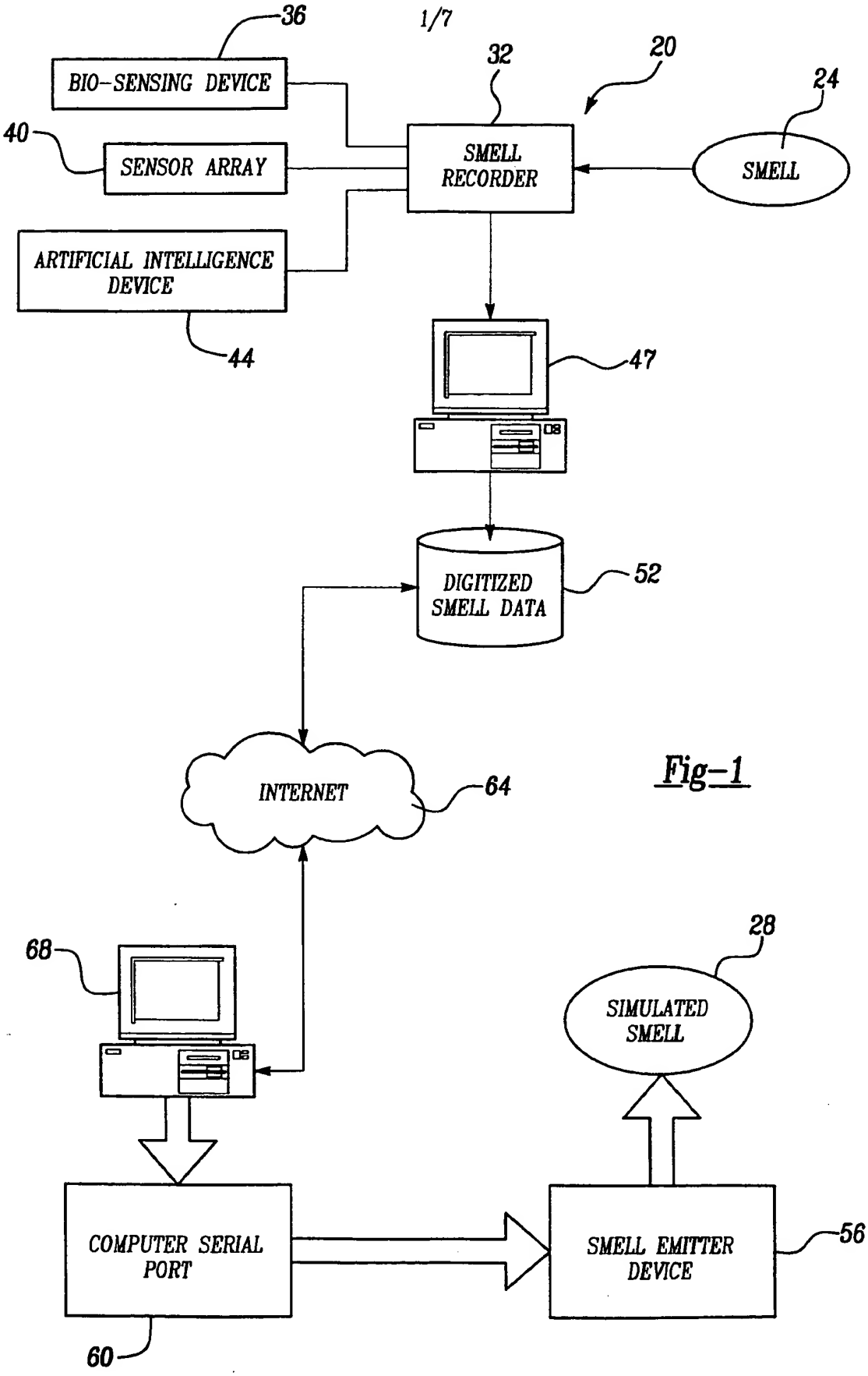

36
BIO-SENSING DEVICE
40
SENSOR ARRAY
ARTIFICIAL INTELLIGENCE DEVICE
44
32
20
SMELL RECORDER
24
SMELL
47
DIGITIZED SMELL DATA
52
INTERNET
64
68
28
SIMULATED SMELL
COMPUTER SERIAL PORT
60
SMELL EMITTER DEVICE
56

Fig-1

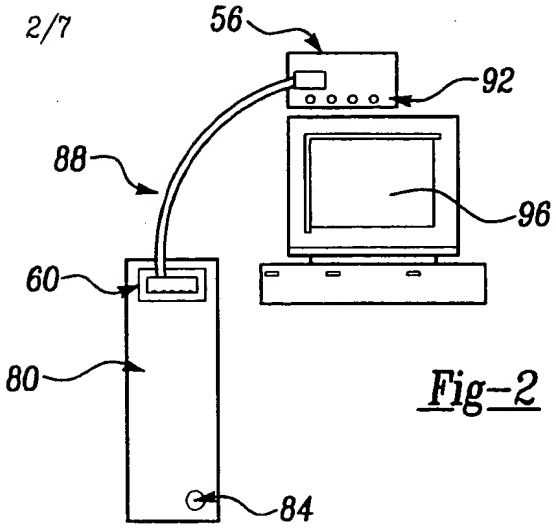


Fig-2

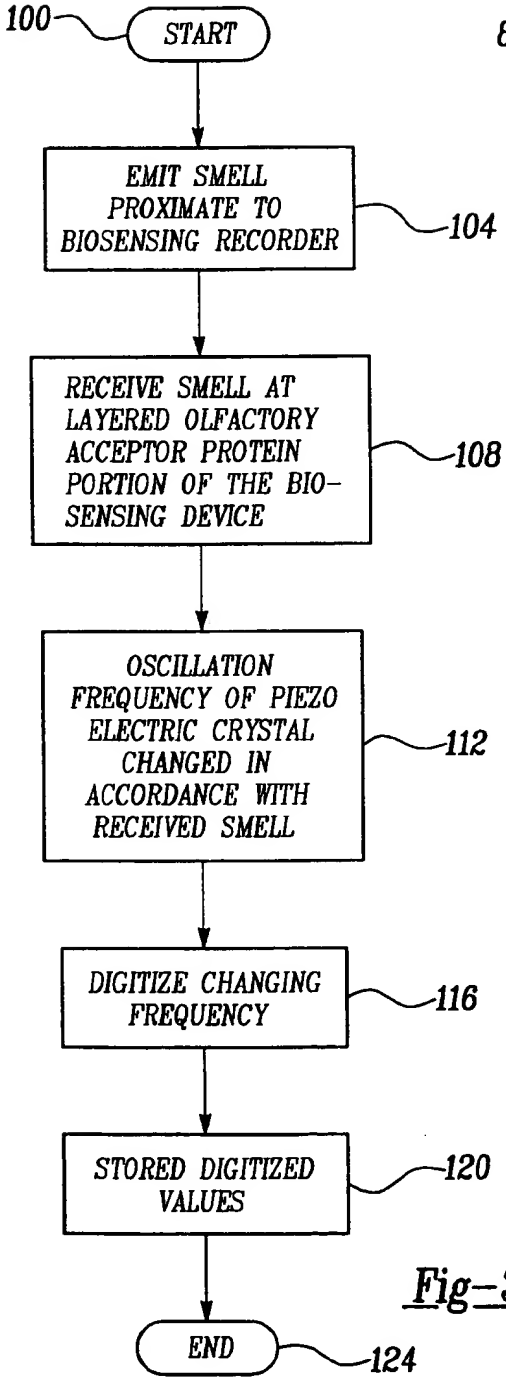


Fig-3

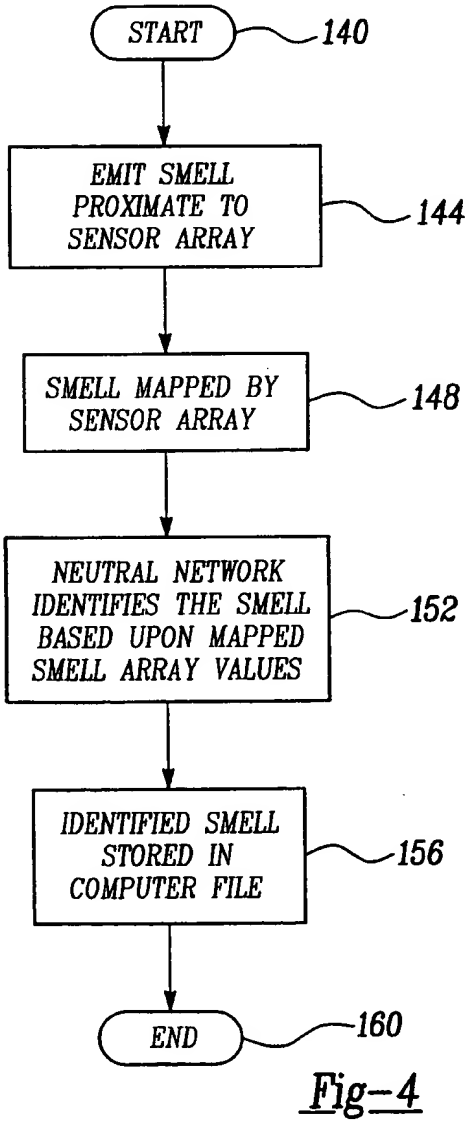


Fig-4

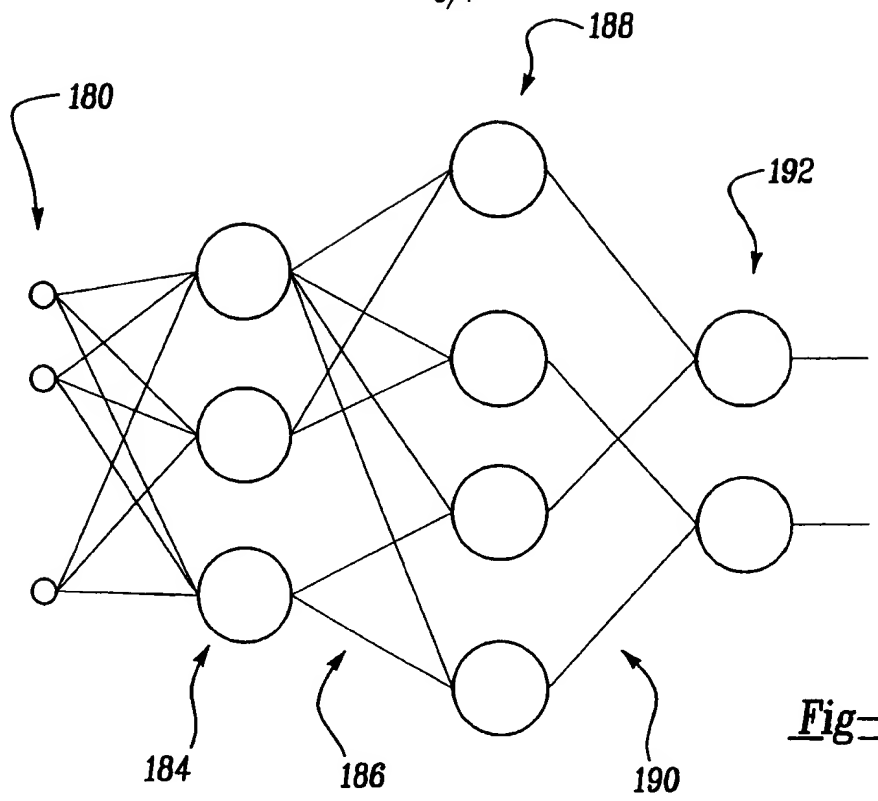

188
180
192
184
186
190

Fig-5

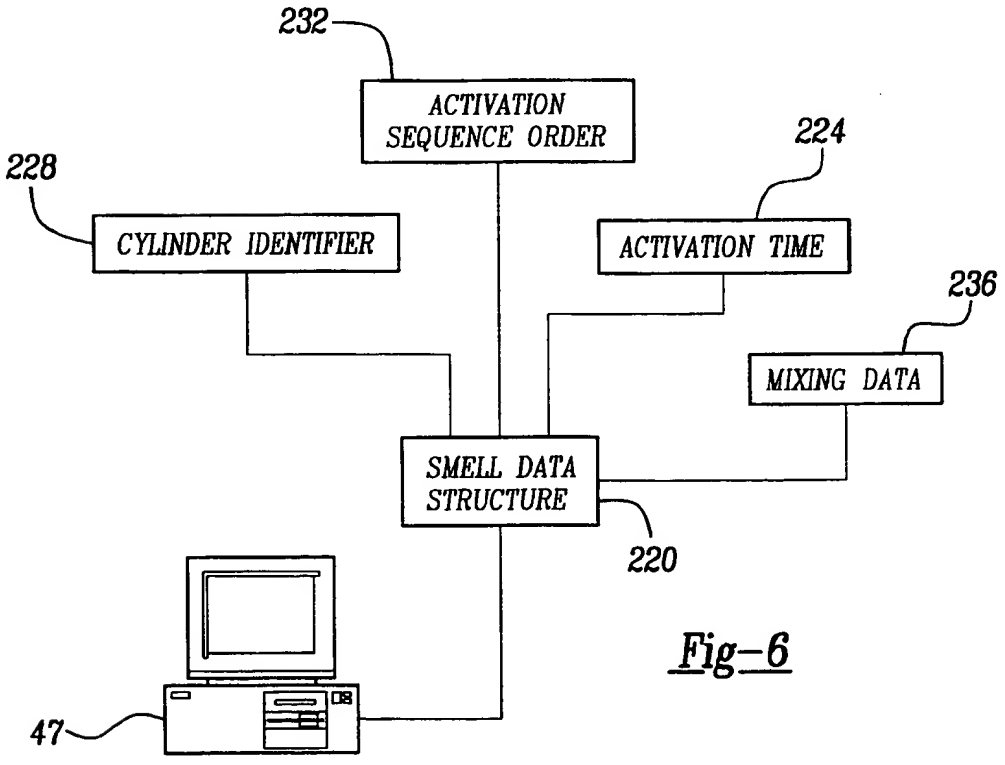

232
ACTIVATION SEQUENCE ORDER
224
228
CYLINDER IDENTIFIER
ACTIVATION TIME
236
MIXING DATA
SMELL DATA STRUCTURE
220
47

Fig-6

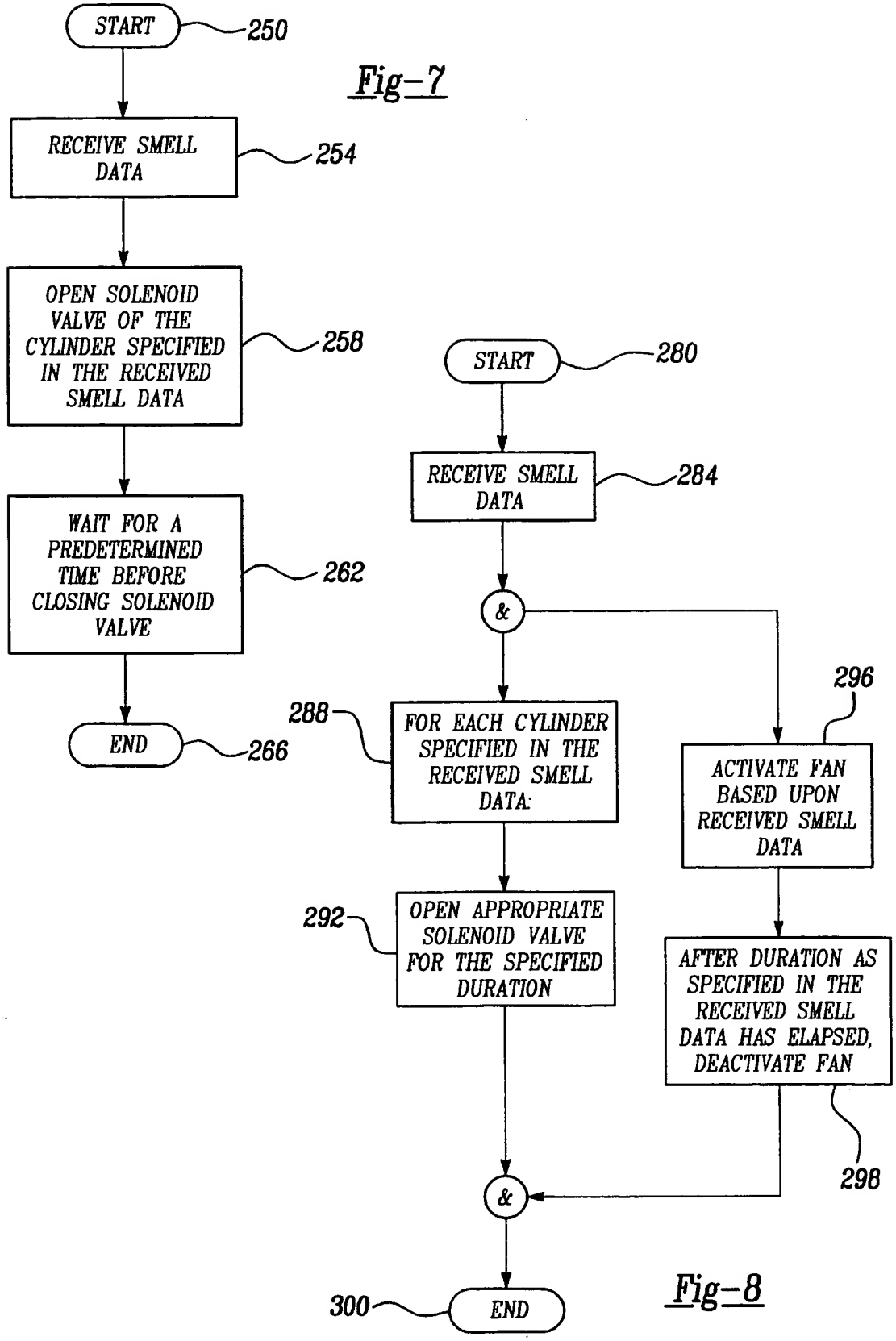

START
250
RECEIVE SMELL DATA
254
OPEN SOLENOID VALVE OF THE CYLINDER SPECIFIED IN THE RECEIVED SMELL DATA
258
WAIT FOR A PREDETERMINED TIME BEFORE CLOSING SOLENOID VALVE
262
END
266
START
280
RECEIVE SMELL DATA
284
&
288
FOR EACH CYLINDER SPECIFIED IN THE RECEIVED SMELL DATA:
292
OPEN APPROPRIATE SOLENOID VALVE FOR THE SPECIFIED DURATION
296
ACTIVATE FAN BASED UPON RECEIVED SMELL DATA
AFTER DURATION AS SPECIFIED IN THE RECEIVED SMELL DATA HAS ELAPSED, DEACTIVATE FAN
298
&
300
END

Fig-7

Fig-8

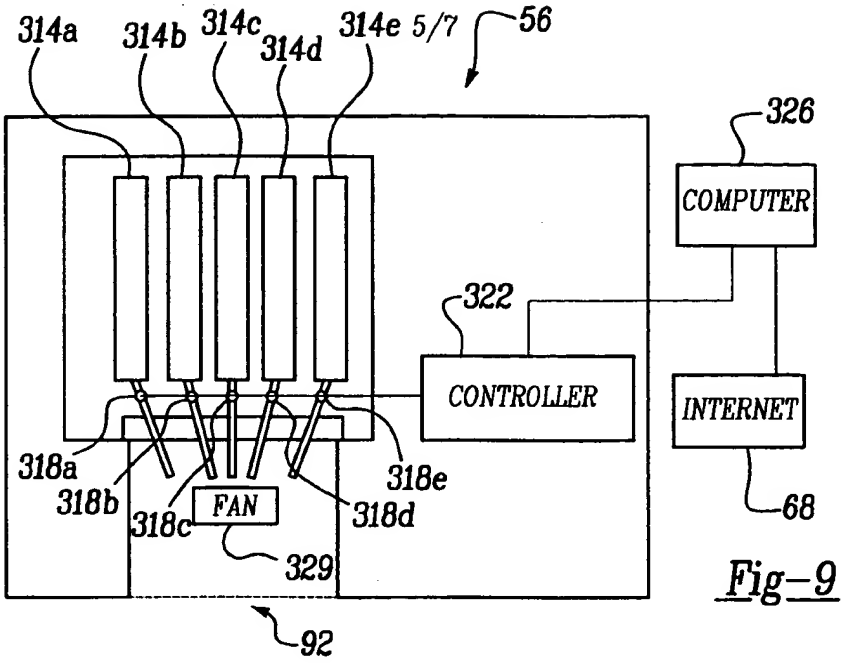

314a
314b
314c
314d
314e
5/7
56
326
COMPUTER
322
CONTROLLER
INTERNET
68
318a
318b
318c
FAN
318d
318e
329
92

Fig-9

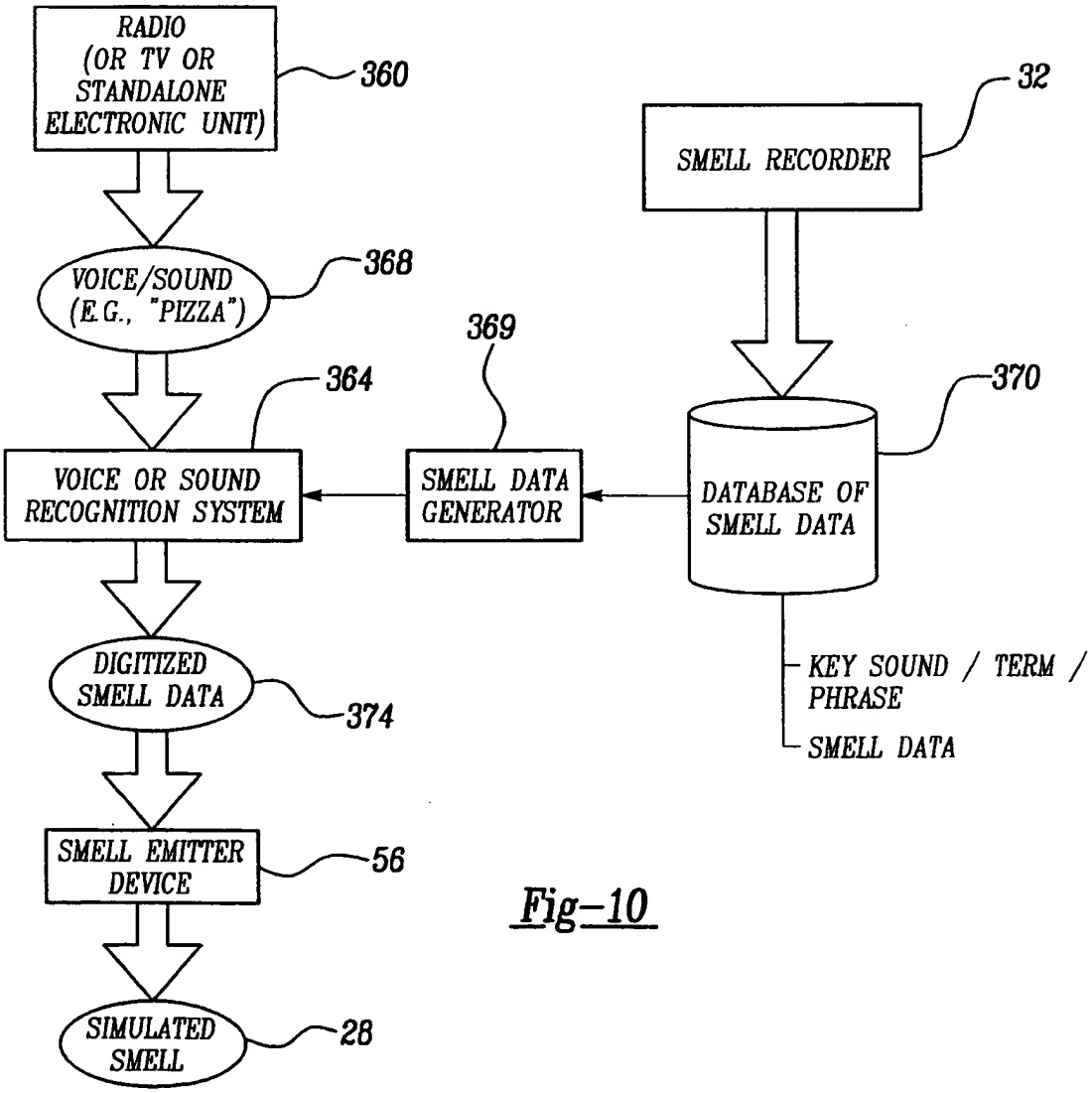

RADIO (OR TV OR STANDALONE ELECTRONIC UNIT)
360
VOICE/SOUND (E.G., "PIZZA")
368
VOICE OR SOUND RECOGNITION SYSTEM
364
369
SMELL DATA GENERATOR
SMELL RECORDER
32
DATABASE OF SMELL DATA
370
KEY SOUND / TERM / PHRASE
SMELL DATA
DIGITIZED SMELL DATA
374
SMELL EMITTER DEVICE
56
SIMULATED SMELL
28

Fig-10

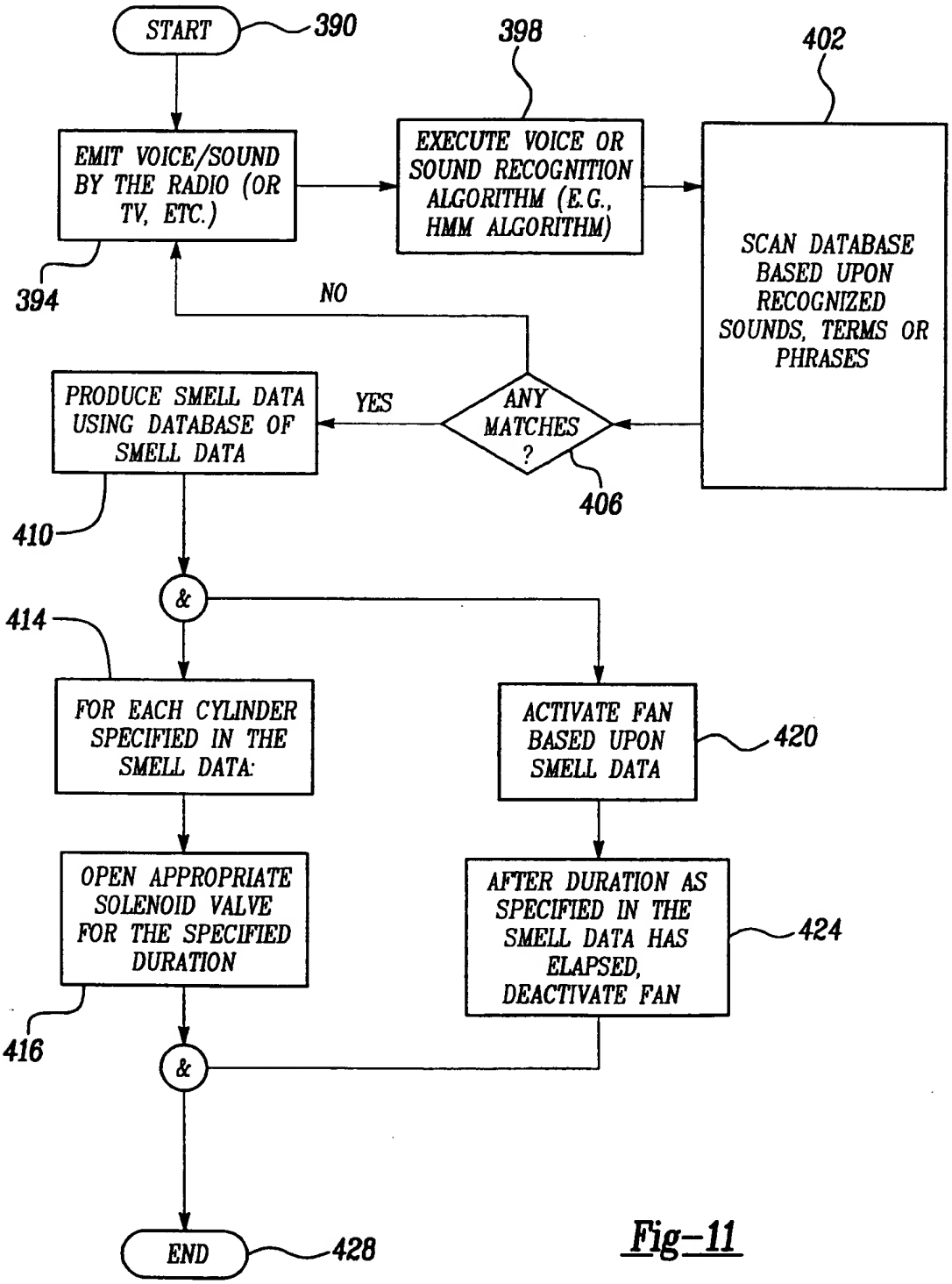
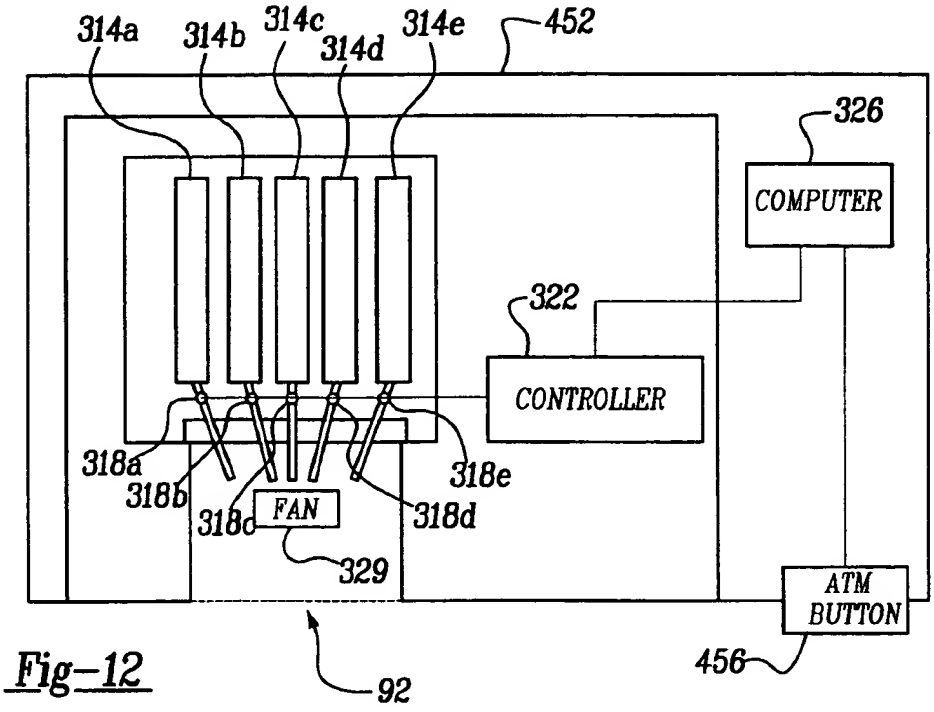
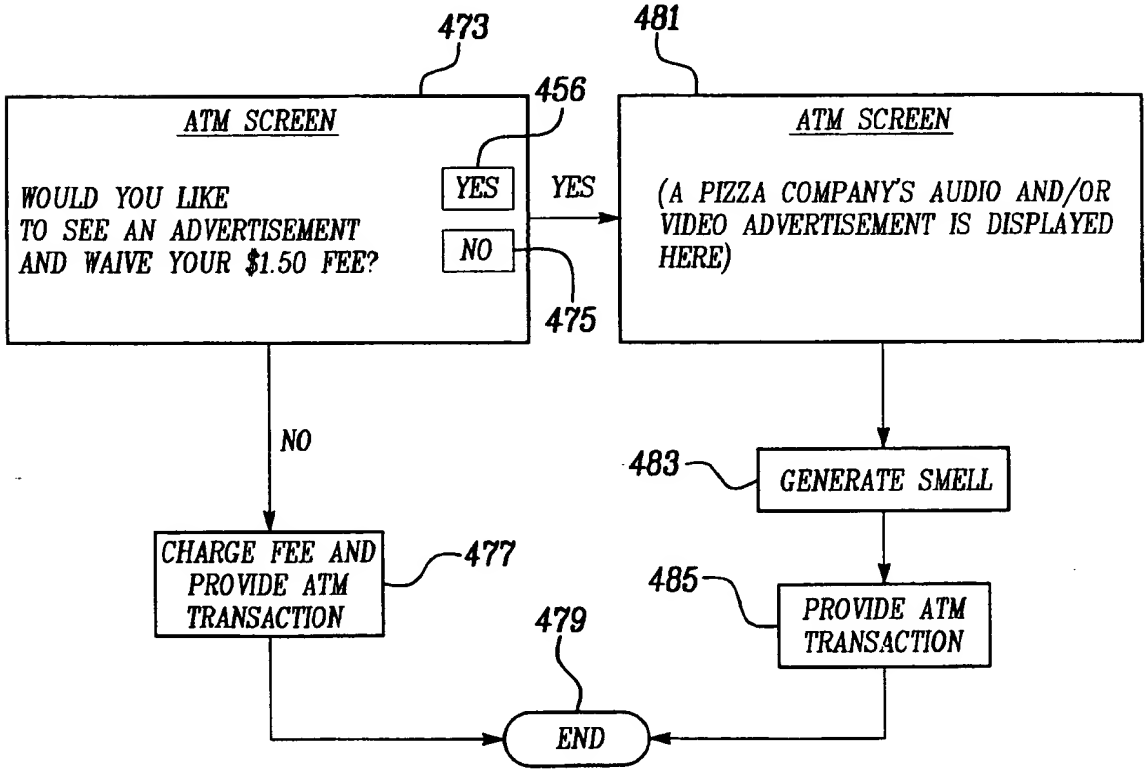

START
390
398
402
EMIT VOICE/SOUND BY THE RADIO (OR TV, ETC.)
EXECUTE VOICE OR SOUND RECOGNITION ALGORITHM (E.G., HMM ALGORITHM)
SCAN DATABASE BASED UPON RECOGNIZED SOUNDS, TERMS OR PHRASES
394
NO
PRODUCE SMELL DATA USING DATABASE OF SMELL DATA
YES
ANY MATCHES ?
406
410
&
414
FOR EACH CYLINDER SPECIFIED IN THE SMELL DATA:
ACTIVATE FAN BASED UPON SMELL DATA
420
OPEN APPROPRIATE SOLENOID VALVE FOR THE SPECIFIED DURATION
AFTER DURATION AS SPECIFIED IN THE SMELL DATA HAS ELAPSED, DEACTIVATE FAN
424
416
&
END
428

Fig-11


314a
314b
314c
314d
314e
452
326
COMPUTER
322
CONTROLLER
318a
318b
318c
FAN
318d
318e
329
ATM BUTTON
456
92

Fig–12


473
481
456
ATM SCREEN
WOULD YOU LIKE TO SEE AN ADVERTISEMENT AND WAIVE YOUR $1.50 FEE?
YES
NO
YES
475
ATM SCREEN
(A PIZZA COMPANY'S AUDIO AND/OR VIDEO ADVERTISEMENT IS DISPLAYED HERE)
NO
483
GENERATE SMELL
CHARGE FEE AND PROVIDE ATM TRANSACTION
477
485
PROVIDE ATM TRANSACTION
479
END

Fig–13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/01287

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) : G06G 7/48
US CL : 364/479.11
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 364/479.11, 479.09, 479.01, 73/23.34, 23.2, 222/3

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,591,409 (Watkins) 07 January 1997, entire document.	1-52 (all)
Y, E	US 5,761,071 (Bernstein et al.) 02 June 1998, entire document.	All
Y	DE 19604600 A 08 February 1996, entire translation.	All
Y	CN 1087994 A 15 June 1994, entire document.	All
A, E	US 5,724,256 (Lee et al.) 03 March 1998, entire document.	All

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"B"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 02 MARCH 1999	Date of mailing of the international search report 15 APR 1999
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer KHOI H. TRAN Diane Smith for Telephone No. (703) 308-1113

Form PCT/ISA/210 (second sheet)(July 1992)*